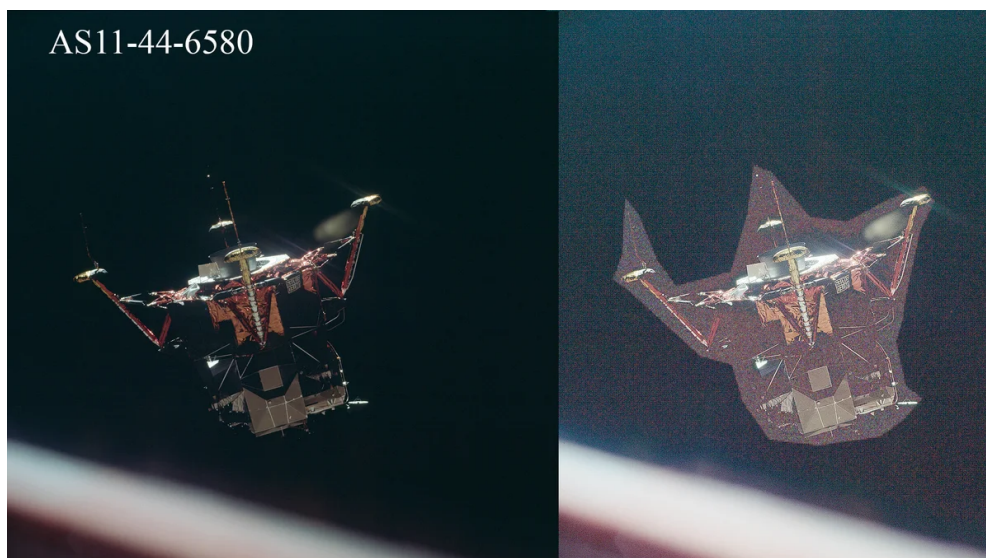


## 66. Why does the blackness around the lunar module and beyond have different graininess?

17-21 minutes

---

Those who follow the latest articles of the "Kinoperator Tells" channel know that they are devoted to the analysis of photographs of the lunar module, around which a mask is visible. This mask is evidence that the image is "glued" from two photographs, and before us is a combined frame, editing, but not a documentary filming of the undocking of the lunar module. The lunar module is "cut out" and superimposed on another photograph of the view from the porthole.



Lunar module undocking, view from the porthole - combined frame.

Lunar module undocking, view from the porthole - combined frame.

One such image from the Apollo 11 mission, where traces of mounting are visible, was described in cinematographer Y. Elkhov in [his article](#) .

Nikolay Ivanov (ING250) [in his video](#), he has already given 6 images from cassette No. 44 of the Apollo 11 mission, where he found similar masks around the lunar module.

We found 18 pictures at once, going one after another in cassette number 44 and talked about it in the article. [65. "Undocking in lunar orbit. Why are all the frames of the lunar module undocking - filming of mock-ups?"](#)

You can check it all yourself by looking at the NASA website here at this link: <https://www.hq.nasa.gov/alsj/a11/images11.html#Mag44>

In addition to the clearly visible mask, the presence of which was confirmed with surprise by many readers, attention was drawn to the fact that the graininess (or noise) of the black background around the lunar module itself, inside the mask, and outside it is noticeably different, this can be seen with the naked eye - you just need to enlarge image.



Fragment of AS11-44-6580 image, LM support from the left side of the image. No processing.

Fragment of AS11-44-6580 image, LM support from the left side of the image. No processing.

Moreover, it is noticeable that the graininess inside the mask is much higher. This becomes especially noticeable if you slightly raise the brightness of the picture and increase the "sharpness" in Photoshop.



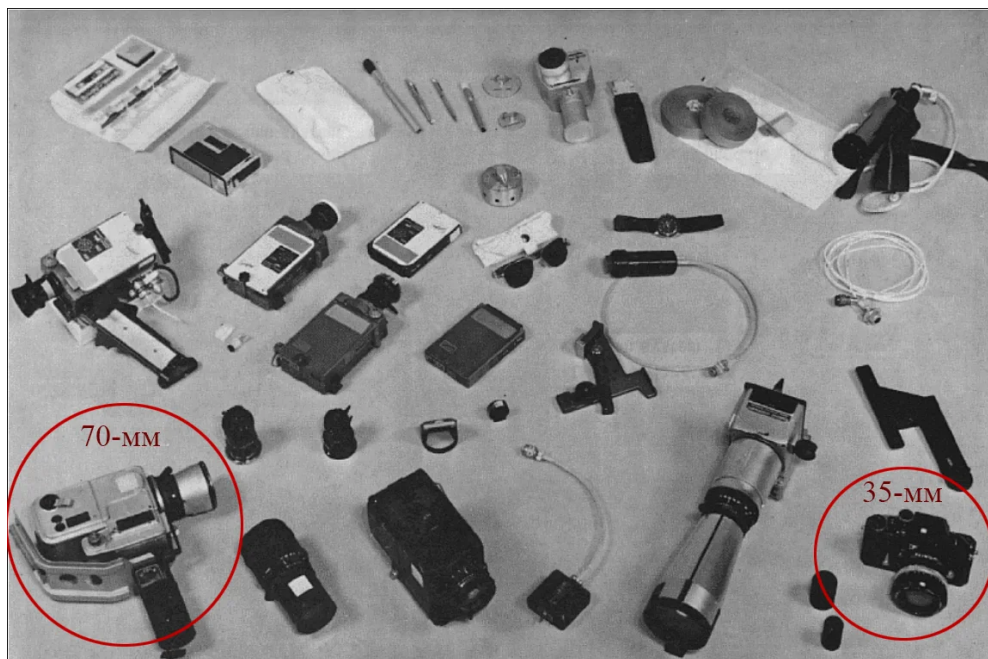
The fragment is slightly lightened and the "sharpness" is increased.

The fragment is slightly lightened and the "sharpness" is increased.

Someone might say that these are the "noises" of the scan. But we stick to the fact that when it comes to photographic images, the standard term "grain" is used here. Granularity is the irregularity in the structure of the emulsion layer, assessed with the eye, while the same irregularity measured with the instrument is called granularity. Accordingly, there are two terms in English - "granulosity" and "granularity".

We believe (and we have good reasons for this) that the difference in grain was due to the fact that two images shot in different formats were combined into one frame. Unsharp elements of the window were filmed with a medium format Hasselblad camera on 70-mm film. The size of the frame there was 53 x 53 mm, large in area, so when it is increased, graininess is practically not visible against the background.

But the main part of the frame, the lunar module, was filmed with a narrow-format camera on 35 mm film. The frame size was 24 x 24 mm. You probably know that a 35mm camera for special filming is mentioned in the Apollo shooting equipment kit (we may talk about its purpose a little later, in other articles). An ordinary 35 mm camera can be found in the famous photograph of the Apollo 11 film and camera equipment. This 35mm camera and two photo cassettes are in the lower right corner of the photo.



Film and photographic equipment of the Apollo 11 mission, where you can see both a 70-mm camera and a 35-mm camera with a wide-angle lens.

Film and photographic equipment of the Apollo 11 mission, where you can see both a 70-mm camera and a 35-mm camera with a wide-angle lens.

Since the lunar module was shot on a small-sized frame, it had to be scaled up in fact 2 times in order to combine it with another image.

A reader who knows the official information that "lunar" shots were shot with Hasselblad cameras will probably be surprised to learn that half of the "lunar" shots (and maybe more) were shot on 35-mm film with a narrow-film camera. However, despite this fact, the footage is signed as if the shooting was carried out by a medium format "Hasselblad".

You may ask a question: what was a 35-mm camera for when the shooting was done by a 70-mm "Hasselblad"? In response, I will say that it is more logical to pose the question in a different way: why was the Hasselblad needed if most of the pictures were taken with a 35-mm camera?

I talked about this in detail, for an hour, in an interview on the DenTV channel. The full version of the conversation on this topic is posted [on the DayTV website](#) , but you can watch it only by subscription. And here is the beginning of a conversation, [about 20 minutes](#) , can be



found freely available on U-Tuba. Due to the fact that few people will watch the full version, I will express the main thesis.

The fact is that **more than half of the shots in the "lunar" expeditions were filmed with the help of models and dolls** . We wrote about this in detail a year ago in the article [14. Could distant shots and landscapes on the Moon have been filmed using puppets and mock-ups?](#)

The very use of mock-ups in cinema is a fairly common thing. This was not only in the "pre-computer" era, but is now used to obtain long-range plans. For example, the city models made for the 2017 film Blade Runner 2049 are well known.



Preparation of layouts for the shooting of the film "Blade Runner 2049" (2017)

Preparation of layouts for the shooting of the film "Blade Runner 2049" (2017)

To make a LONG plan of the lunar landscape in the pavilion on a scale of 1: 1 in the pavilion is simply unrealistic. It is technically impossible to build such a gigantic pavilion with several football fields, and, moreover, even the most powerful lighting device will not be able to illuminate the entire area like the light of the sun.

We know that several hundred (and sometimes more than a thousand) floodlights are installed to illuminate just one football field.



Part of the stadium lighting.

Part of the stadium lighting.



Lighting masts for a football field.

Lighting masts for a football field.

To create the feeling of a single source of light in the frame (imitation of the light of the sun), small spaces are used during filming - such pavilions are much smaller in size than a stadium. GENERAL and MEDIUM plans are filmed there. Here, for example, is the set of the pavilion, where the scenes with the lunar module were filmed for the 2005 film "Journey to the Moon". It is smaller in size than a football field. It can be seen that the illumination in the lower corners of the decoration is noticeably lower than in the center.



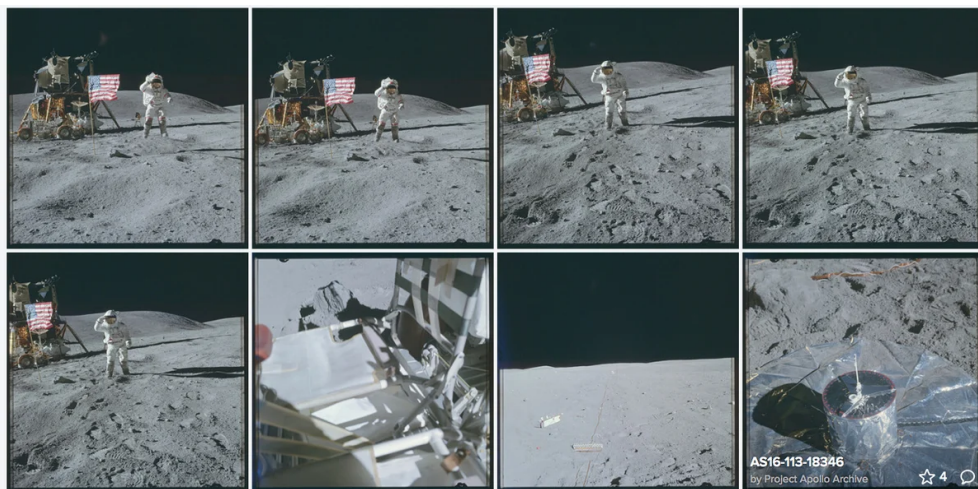


Shooting of the movie "Voyage to the Moon" (2005), directed by Tom Hanks.

Shooting of the movie "Voyage to the Moon" (2005), directed by Tom Hanks.

In such pavilions, the ability to pan left and right is limited - there are technical devices on the sides. And the frames for the film are shot almost static.

If we look at the "lunar" footage of different expeditions ("Apollo-15", "Apollo-16", "Apollo-17"), where the astronaut is next to the lunar module, we will notice that all the frames were taken from approximately the same the same points and practically no panning left-right. The shift can be at most half a frame.

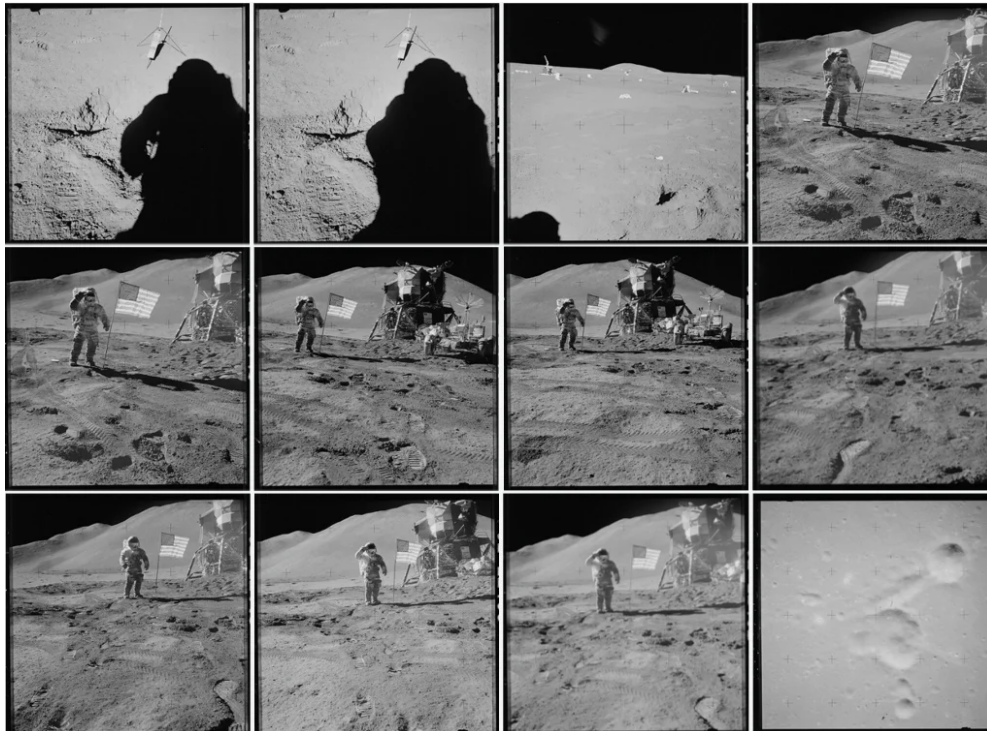


Five consecutive frames with the lunar module, the Apollo 16 mission.



Five consecutive frames with the lunar module, the Apollo 16 mission.

For comparison, a series of sequential shots from the Apollo 16 mission (photo above) and Apollo 15 (photo below).



A cassette with black and white photographic film from the Apollo 15 mission.

A cassette with black and white photographic film from the Apollo 15 mission.

Pay attention to one more sign that emphasizes that we are facing combined surveys: we do not see intermediate frames of the lunar module taken from different distances. Instead, all frames during several expeditions are shot in the same way from the same distance, in the same angle. And then, in the same preset frame boundaries, the necessary "elements" are inscribed (placed in the frame): a mountain in the background (this is a projection onto a movie screen), a lunar module, an astronaut and an electric vehicle (rover). Look at those photographs that precede the "Photo session at the lunar module" - these are frames taken in a different place and at a different time: this is some kind of seat from the rover, then the corner of some module, then a large part of the flag, sometimes - just a frame with the shadow of an astronaut, or even a frame from orbit in general.

We wrote about this a year ago in an article: [5. The Americans filmed different landings on the moon in the same pavilion.](#)

It is in such a relatively small pavilion that medium and general shots are filmed. When it is necessary to shoot DISTANT plans - a lunar landscape with a small figure of an astronaut and a lunar module in the distance, then the shooting is done in the same-sized pavilion, only instead of full-size models they use several times reduced copies. It might look something like the picture below.



The puppets represent astronauts.

The puppets represent astronauts.

And mountains and craters are made by people whose profession is called "model" or "props". This is what the mountain landscape from the James Bond movie "Golden Eye" actually looked like.



Preparation of the scenery for the film "Golden Eye", 1995 (In the back of the frame, just around the corner, there are two more decorators.)

Preparation of the scenery for the film "Golden Eye", 1995 (In the back of the frame, just around the corner, there are two more decorators.)

When filming "lunar landscapes" for the Apollo missions, they used dolls 25-30 cm high. This was the technology of filming at film studios that had been worked out for decades. In puppet cartoons, it is this size of dolls that has found the greatest use.



Dolls from the cartoon "Hoffmaniada" (2018), dir. Stanislav Sokolov.

Dolls from the cartoon "Hoffmaniada" (2018), dir. Stanislav Sokolov.



And here we come to an interesting feature of shooting mockups and dolls. As soon as we start shooting them from a close distance, the shallow depth of field (DOF) immediately gives this shooting.



A still from the cartoon "Hoffmaniada". General plan of the town. In the distance - blur.

A still from the cartoon "Hoffmaniada". General plan of the town. In the distance - blur.



A still from the cartoon "Hoffmaniada". The foreground fades into blur.

A still from the cartoon "Hoffmaniada". The foreground fades into blur.

We are used to (those who have worked with 35-mm cameras know this for sure) that on a sunny day at aperture of 1: 8 or 1:11, the depth of field (DOF) in the images is very large. But it doesn't work with



layouts. The foreground is rendered out of focus. And it looks unnatural.

Pay attention to this "moon" frame. The small figure in the back of the frame is a motionless doll, it is in sharpness, and the foreground goes out of focus.



Filming of the astronaut doll for the Apollo 17 mission. The foreground is not sharp.

Filming of the astronaut doll for the Apollo 17 mission. The foreground is not sharp.

In the next frame, there is also a doll, only now it is sitting motionless on a toy rover. The track in the foreground also fades into blur.



A doll on a toy rover from the Apollo 17 mission. The ruts in the foreground are blurred.

A doll on a toy rover from the Apollo 17 mission. The ruts in the foreground are blurred.

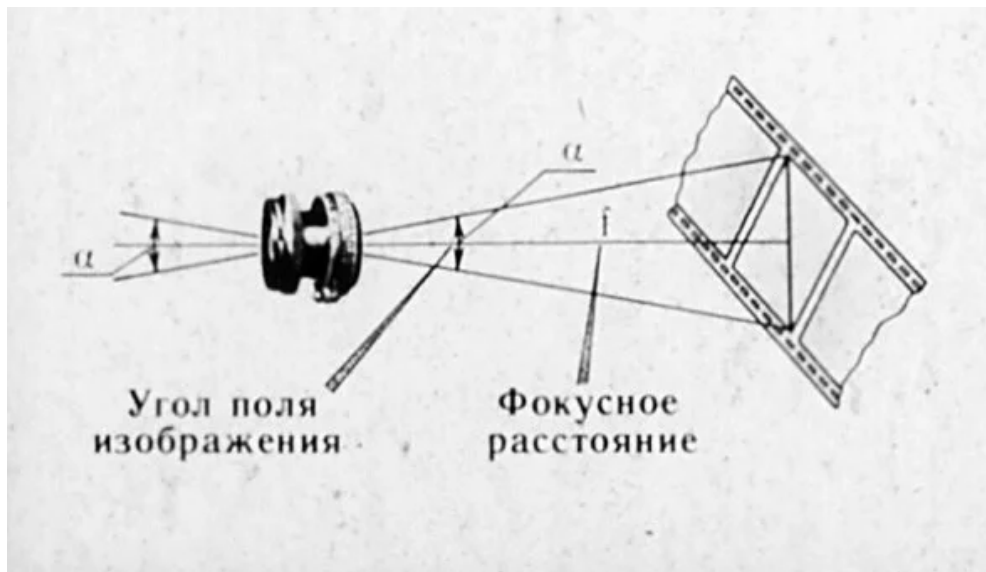
Without dolls and models, it will not be possible to shoot distant shots and "lunar" landscapes. And lest you guess that there are small copies in the frame, NASA came up with a trick - to explain the small depth of field for a completely different reason - the frame was allegedly filmed with a medium format camera. And on the medium format, the depth of field, as you know, is always less than on narrow-film cameras.

We know that large aspect ratios require a long focal length lens. And the longer the focal length of the lens, the shallower the depth of field.

The rule here is. A normal lens for a camera (covering an image field angle of approximately  $45^\circ$ ) is considered to be one whose focal length is equal to the diagonal of the frame.

If we take 35 mm film and a square frame size of 24x24 mm, then the diagonal of the frame (according to the Pythagorean theorem) will be

34 mm.



The relationship between the angle of view and the size of the frame.

The relationship between the angle of view and the size of the frame.

And if the film is wide, 70 mm, and the frame size is 53x53 mm, then the diagonal of the frame is 75 mm, which is 2.2 times more than on 35 mm film.

Thus, for Hasselblad with 70 mm film, a lens with a focal length of 75 mm will be considered **"normal"**. In terms of the angle of the image field, the "34 mm" lens on a narrow film is equivalent to a "75 mm" lens on a wide film.

We know that according to the NASA legend, a Biogon lens with a shorter focal length, 60 mm, was used during the shooting. It was not "normal" in terms of the angle of coverage, but a **wide - angle** lens.





Medium format "Hasselblad" converted for 70mm film.

Medium format "Hasselblad" converted for 70mm film.

Such a 60mm lens on wide film would be equivalent to a "28mm" wide-angle lens on 35mm film. A focal length of 28mm is considered standard in the range of discrete lenses. Lenses with this focal length can be easily found from different manufacturers.

How will the 28mm lens differ from the 60mm lens in terms of the "picture"? Let's illustrate the difference with a variable focal length (zoom) lens.

When we set a focal length of 28 mm on the lens, we notice that almost all objects in the frame are obtained in sharpness: cars at a distance of



several meters, trees, a house in the distance, and even the front of a bench.



The lens is set at a focal length of 28 mm.

The lens is set at a focal length of 28 mm.

If you translate the focal length to 60 mm, then not only the house in the distance will go out of focus, but the cars standing next to it will lose their clarity - the depth of field will be much less. And already the middle of the bench will go out of focus (see left corner).



The lens is set to a focal length of 60 mm.

The lens is set to a focal length of 60 mm.

If we shoot a small figure of an astronaut at a focal length of 28 mm, then it is enough to move it half a meter away to make the astronaut full-length.



The lens of the 35 mm camera is mounted at a focal length of 28 mm.

The lens of the 35 mm camera is mounted at a focal length of 28 mm.





The distance to the astronaut figurine is half a meter (50 cm). Distance is measured from the matrix.

The distance to the astronaut figurine is half a meter (50 cm). Distance is measured from the matrix.

Under such shooting conditions, we will get blur both in the background and in the foreground.



But instead of admitting that this is a photograph of a chrysalis, we will say that there was a large figure of an astronaut in the frame, just the frame was taken with a medium format Hasselblad camera, so there is such a shallow depth of field.

This is exactly what NASA did, inventing a beautiful legend about the use of the Hasselblad camera. In fact, all the distant shots and all the lunar landscapes were shot with a conventional 35 mm camera with a 28 mm wide-angle lens. This is so important that I will repeat once again: ALL the distant shots and lunar landscapes in the Apollo missions were shot on mock-ups, and all of them were shot on 35 mm film.

And only now we are a little closer to solving why the combined frames of "undocking the lunar module" have different graininess, inside the mask and outside it. For the combined frame, a blank was made - a frame of the command module's window, through which the undocking was allegedly taken. And to get the natural blurriness of the window edging, characteristic of a medium format camera, the window was actually filmed on 70 mm film with a medium format camera. And the lunar module is a mock-up, and it was filmed with 35 mm film. And in



order to combine these two images into one frame, the frame with the lunar module had to be scaled 2.2 times. That is why graininess became noticeable on this fragment.

Filmmakers will not use the 15-ton lunar module for filming, hanging it in a cunning way and rotating it in different planes relative to the window to get undocking footage. None of you have seen this lunar module "live", so you will never distinguish a miniature copy from the original. That is why the models are being removed.

These facial features are difficult to fake, and everything else is easy to fake. There is no problem to make a doll that looks like a living astronaut. The most important thing is never to show the face of an astronaut wearing a helmet.



The "Astronaut" doll is convincingly similar to a living person. That's just the face gives out.

The "Astronaut" doll is convincingly similar to a living person. That's just the face gives out.

Have you seen an astronaut's face through the glass of a helmet in any "lunar" photograph? Most likely they did not see it. Among several hundred photographs of astronauts, there are only a couple of pictures where a semblance of a face can be seen through a helmet, but it is not possible to identify who it is.

And if the model of the lunar module is used, then the inexperienced viewer will never guess that instead of a large device there is a small copy in the frame. This can be noticed only by those who have been near the full-size lunar module for a long time, or by those whose profession is a layout designer - creator of small copies.



Reduced models.

Reduced models.

We have stated our point of view on the issue of different "graininess" inside the mask and outside it. It is possible that other factors influencing graininess were also present, such as overall image density. It is known that the graininess is higher on dense frames. It is possible that we have not taken into account something else.

But the indisputable fact is that 18 frames at once in one cassette of the Apollo 11 mission turned out to be fakes "- combined shots made

on a trick machine, forgeries under" documentary footage. " since it is supposedly one continuous tape.

It can also be considered a priority version that about half of the so-called lunar landscapes were filmed using models and dolls. They were filmed not with a medium format Hasselblad camera, but with a narrow-film (35 mm) camera with a 28 mm wide-angle lens.

**And, of course, the graininess change occurs due to the different magnification scales of the image inside the mask and outside it. Scaling in the graphical editor shows a two-fold change in the size of the "grains".**

\*

Cameraman L. Konovalov was with you.

The topic of masks in the images of "lunar module undocking" has not been exhausted, so there will certainly be a continuation in the near future.

Until next time!